

# Statistics Students' Skills: What Does the Workplace Need?

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#### **Topics**

- Statistical skills
- In addition to statistical knowledge, what skills do employers need from new graduates?
- Communications
  - Oral
  - Written
- Organizational skills
- Leadership
- Ethical principles



#### Why I'm Interested

- Westat
  - Director, Statistical Group
  - Consulted on Quality Improvement
- ASA
- Special Faculty at the Joint Program for Survey Methodology
- GMU Statistics Dept. Advisory Board

#### **Westat**

- Survey research, primarily government customers
- 2000 employees at Rockville Headquarters
- 10,000 temporary field staff
  - In-person interviewing
  - Measurement, including testing
  - Phone interviewing
- Surveys
- Case Control studies, Epidemiological studies, Clinical trials



#### **Westat Statistical Group**

- 70 MS & PhD statisticians
- Authors, presenters, instructors
- Areas of expertise:
  - Survey Methodology: reducing total survey error
  - Sample Design/Selection: Weighting, Imputation, Variance Estimation
  - Analysis: Multiple/Logistical Regression, Survival Analysis, HLM, Propensity Scores
  - Item Response Theory

## **Survey Methodology**

- Reducing total survey error
- Improving response propensity
- Assessing potential bias
- Minimizing recall errors

## Sample Design/Selection

- Sample Designs
- Weighting
- Imputation
- Variance Estimation

#### **Analysis**

- Multiple/Logistical Regression
- Survival Analysis
- Hierarchical Linear Models
- Propensity Scores
- Machine Learning
  - **→**Boosted regression

#### **Software Skills**

- SAS
- SUDAAN
- SPSS
- Stata
- R
- Python

#### We assume...

- Graduates receive
  - Deep and broad statistical knowledge
  - Experience with relevant software
  - Experience solving statistical problems
- What else will they need in the workplace?
  - Can graduate programs provide these skills?
  - Should graduate programs provide these skills?

#### What Else do Employers Need?

- Communications
  - Oral
  - Written
- Organizational skills
- Leadership training
- Ethical Principles



#### Organizational & Leadership Skills

- Organizing a task into components
  - Assigning responsibilities
  - Providing support
- Estimating effort
- Scheduling tasks
- QC the process

## **Ethical Principles**

- Confidentiality & Privacy
- Informed Consent
  - IRB
- Conflicts of Interest
- Objectivity, Impartiality
- Professional Competence

#### **Summary**

- Statistical & computer skills
- Communications
- Organizational skills
- Leadership training
- Ethical principles

